

# **CERES Data Management System**

**Items for Discussion - April 1998**

**Schedules**

**Working Group Status**

**Initial TRMM Operations and Processing**

**Current Processing Issues**

**Near-term Plans**

Contributions to this report from:

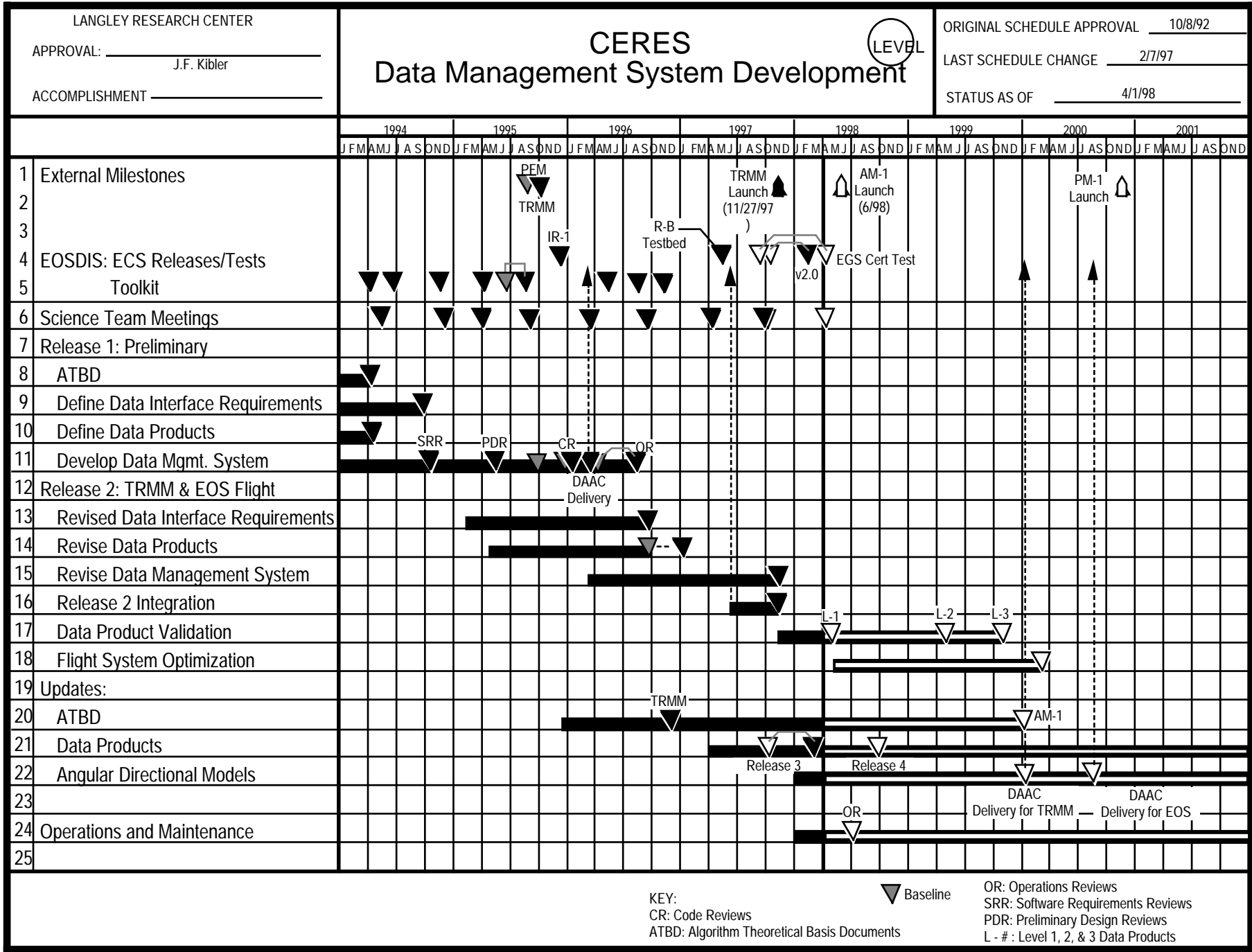
John Chapman  
Kay Costulis  
Chris Currey  
Michelle Ferebee  
Erika Geier  
Calvin Mackey  
Maria Mitchum  
Jill Travers

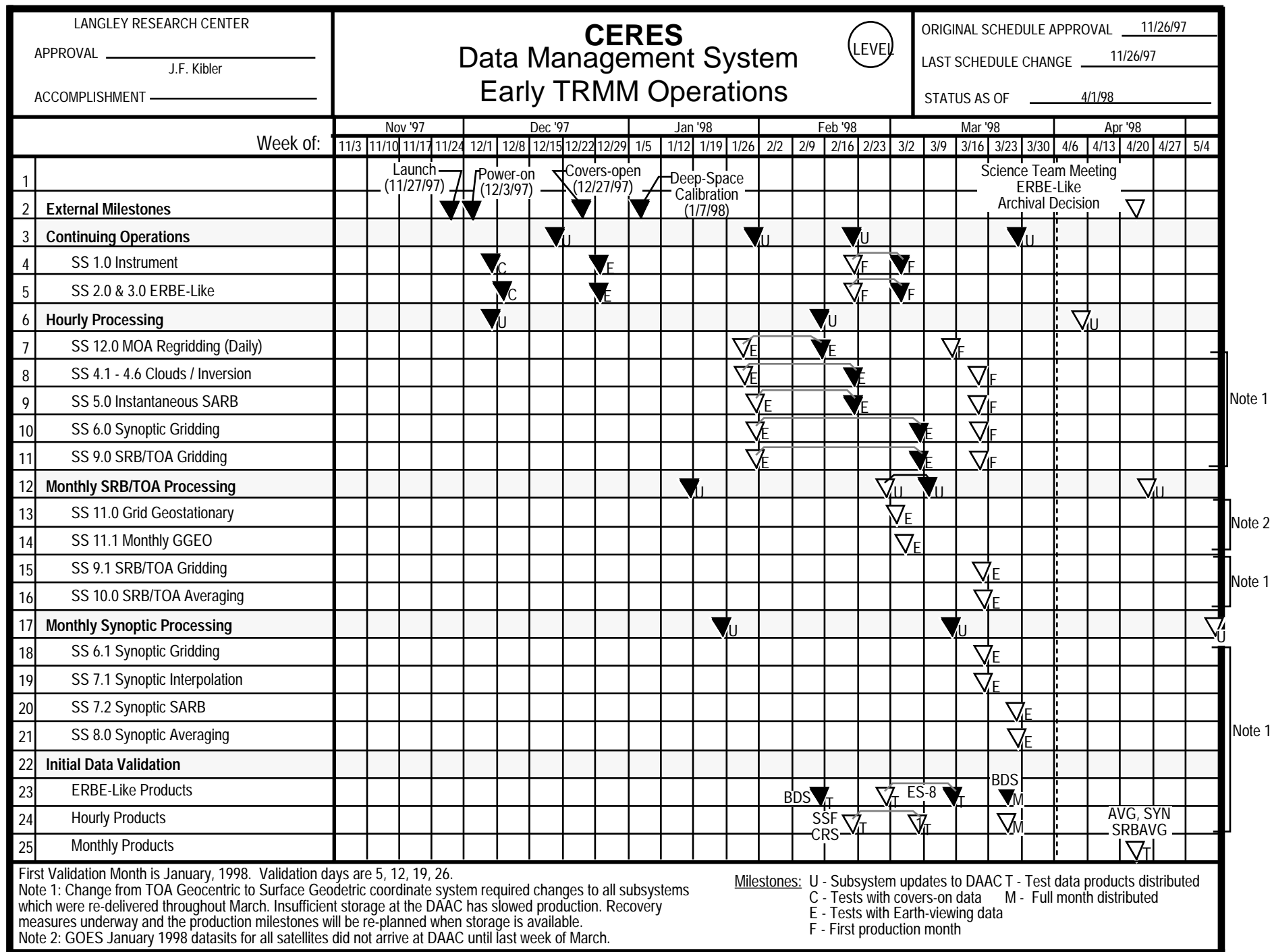
Lee-hwa Chang  
Lisa Coleman  
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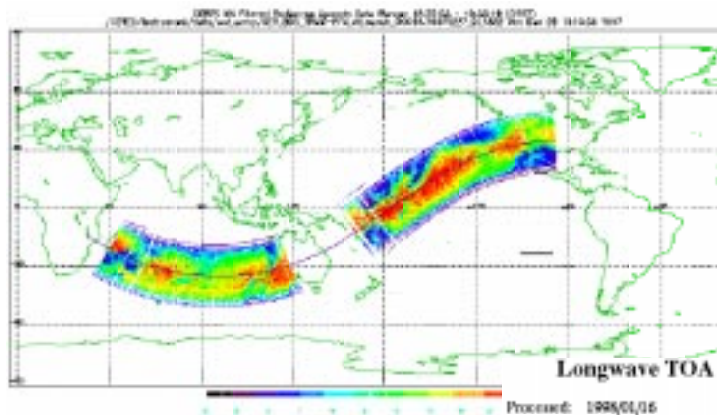
## **Events since last Science Team Meeting**

- **Release 2 Data Management System deliveries to the DAAC completed before TRMM launch**
  - **Most of the subsystems actually worked!**
- **TRMM Instrument Support Terminal worked well for monitoring post-launch operations**
- **TRMM Instrument Simulator completed and used to check software loads at power-up**
- **Instrument and ERBE-like subsystems running continuously at DAAC using the LaRC TRMM Information System (LaTIS)**
- **Decision to use LaTIS for EOS-AM1 processing**
- **Quick-look data posted to web on 12/31/97 - still had warts**
- **BDS available to team members on 2/13/98 - the biggest warts removed**
- **ES8 available to team members on 3/13/98 - not quite consistent with ERBE**



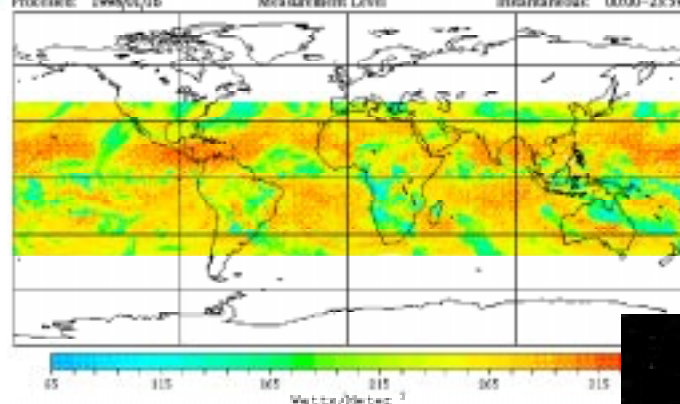


# CERES Science Data Processing is Operational for the TRMM Satellite



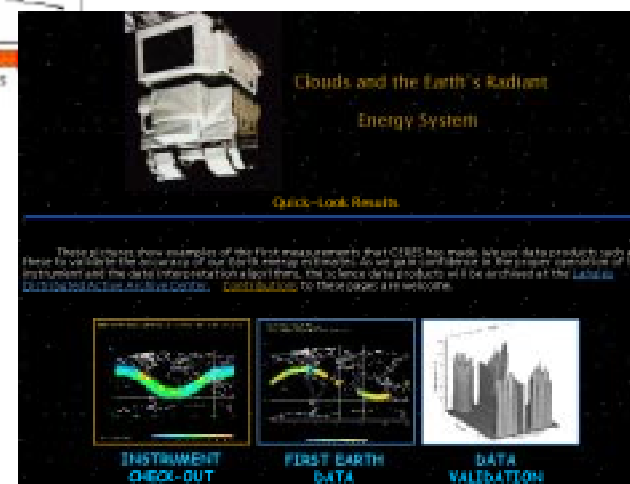
- Contamination covers opened December 27, 1997
- First Earth-viewing data processed at the DAAC within hours of data acquisition

Results from each run posted immediately to web for validation



ERBE-like processing produces daily radiation budget estimates

- First engineering evaluation and science results published on public web page by December 31, 1997
- CERES Data Management System runs daily at the LaRC DAAC to produce science data products



## **How we spent the holidays...**

### **On the covers-open day (12/27/97 - Saturday)**

- **Real-time monitoring/commanding**
  - Greg Stover camped out at the GSFC TRMM control center
  - Jack Cooper, Leonard Kopia, Larry Brumfield, Michelle Ferebee, John Chapman, Bruce Barkstrom, Bob Lee, Kory Priestley watching the IST screens at Langley
- **Get the data networks working**
  - Shutdown on Christmas Eve
  - Bob Seals, Jim Kibler, DAAC and GSFC troops worked to retrieve quick-look data sets
- **Analysis of playback data**
  - Web access to plots and data thanks to Bill Weaver, Phil Hess and Beth Flug

### **From Sunday to Wednesday (12/28-31/97)**

- **Level 0 and ERBE-like data processing**
  - Denise Cooper, Lee Hwa Chang and lots of folks at SAIC & DAAC
- **Analysis of instrument & algorithm performance**
  - Cooper, Stover, Priestley, Kibler, Chris Currey, Erika Geier, Troy Anselmo, Kam-Pui Lee, Fred Rose, and many others at TRW and SAIC/AS&M
- **Quick-look results**
  - Plots from Georgia Liu and others were posted on the web by Kay Costulis, using a dial-in link from home on New Year's Eve
  - Kay reported about 10,000 hits on web site within 1st two weeks
  - About 300 unique hosts: 40% from Langley, rest from a wide variety of locations

## **External Interfaces and Mission Operations**

### **Responsible for:**

- **Negotiations with GSFC, EOS, and TRMM Projects**
- **Coordination with Langley CERES Project Office and TRW**
- **TRMM and EOS Instrument monitoring, real-time displays, instrument health and status**
- **Software to distribute/analyze housekeeping data from TRMM ISW to LaRC workstations**

### **TRMM:**

- **ISW was used extensively to view real-time housekeeping screens early in mission**
- **CERES planning aids and housekeeping data files are available at the following website:**  
[http://lposun.larc.nasa.gov/~dms/TRMM\\_IST/](http://lposun.larc.nasa.gov/~dms/TRMM_IST/)

### **EOS-AM:**

- **Participated in several Instrument Support Terminal (IST) training sessions.**
- **Participated in CERES Operations meetings with the Flight Operations Team at GSFC.**
- **The IST software was upgraded to release B in January, 1998, and a patch was installed to correct a software malfunction that prevented telemetry data transmission.**
- **LaRC personnel participated in an integrated simulation in February**
  - **Telemetry data from the EOS-AM spacecraft test was viewed via the IST.**
  - **Planning aid files were ftp'ed to a LaRC computer.**
  - **The IST was not fully functional during the test.**

### **Near-term Plans:**

- **Continue to work flight operations details with TRMM and EOS-AM personnel.**

# CERES Contamination Covers Opened: 12/27/97

CERESHK2 - TRMM - Mission Operations Center - Front End TR2FE1 (Display only)																																																															
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# TRMM IST web page used for viewing real-time playback and trending

Netscape: Select Data to Plot

Select Snap File:  
LARCSNAP.0672337 (98-067-23:38:44.777)  
LARCSNAP.02943A (98-096-12:50:26.381)  
LARCSNAP.02170 (98-104-13:26:23.233)

Default Graph: btf1 Set Plot Parameters

New Default Graph:

Plot Parameters

X-Axis Format: # seconds since 1st pass

Y-Axis Label:

Plot Title: TRMM CERES MAIN COVER OPENING

Housekeeping Parameters:  
CMAINCOVMTRT  
CMAINCOVP1  
CMAINCOVP2  
CMAINCOVPST  
CMAINSTPCT

Blue CMAINCOVP1 Set to selected h/k parm

Green CMAINCOVP2 Set to selected h/k parm

Cyan Set to selected h/k parm

Red Set to selected h/k parm

Magenta Set to selected h/k parm

Pink Set to selected h/k parm

Gold Set to selected h/k parm

Brown Set to selected h/k parm

Create Plot Reset Form Cancel

Netscape: TRMM IST

File Edit View Go Bookmarks Options Directory Window Hel

Back Forward Home Reload Images Open Print Find Stop

Location: http://lposun.larc.nasa.gov/~cms/TRMM\_IST/IST\_top.html

What's New? What's Cool? Destinations Net Search People Software

File  
-View File  
-View Selected Parameters

Plot

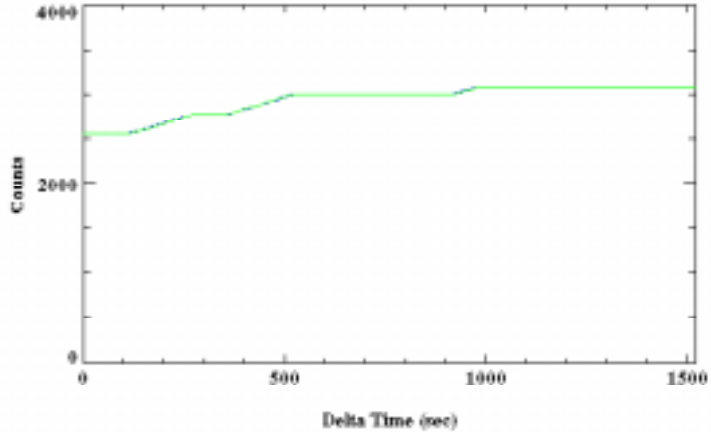
Help  
-Comments/Questions  
-Documentation

TRMM IST Information Page

This web site is under development. Suggestions for additional capabilities are not only welcome but very much needed. Please send all comments/questions to Beth Flug ([b.t.flug@larc.nasa.gov](mailto:b.t.flug@larc.nasa.gov)).

These web pages use Netscape built-in features and are, therefore, best

TRMM CERES MAIN COVER OPENING



SNAP FILE : LARCSNAP.00469A PLOT DATE: 04/14/1998 11:59:37.000  
DATA DATE: (Start) 97-361-17:30:22.952  
(End) 97-361-17:55:45.444

Channel	Min	Max
CMAINCOVP1	2560.00	3090.00
CMAINCOVP2	2556.00	3086.00

# **CERES Instrument Simulator**

**Flight processor simulation for validation of re-programming and in-flight anomaly investigation**

## **Current TRMM Status:**

- **Fully functional TRMM simulator packaged and delivered prior to launch**
- **Used to check instrument software uploads on power-on day**
- **Alongtrack Scan command developed**
- **Symmetric Short Scan Sequence developed**
- **TRW BCU ver 1.5 software being debugged for PC Long Command checksum anomaly**

## **Current EOS-AM1Status:**

- **Simulator EOS-AM1 CERES ICP/DAP & SC/IF cards now wired and installed in enclosure**
- **Interrupt driven I/O cards to link Matlab/Simulink gimbal models to CERES processor**
- **Host-PC software: Reuse Virtual Instrument rate and position I/O drivers**
- **New Pentium 233 MHz (with 4 ISA slots) ready for BCU ver 4.x software**
- **EOS-AM1 flight code now loaded into 27C64 EPROMs and installed in simulator**

## **Near-term Plans:**

- **Functional checking of EOS-AM1 cards and chips in enclosure**
- **Boot-up of ICP and DAP processors with EOS-AM1 flight code mid-April**

## **Working Group: Instrument**

### **Responsible for:**

- **Subsystem 1 (Instrument Geolocate and Calibrate Earth Radiances)**

### **Data Products:**

- **BDS (Bi-Directional Scan)**
- **IES (Instrument Earth Scan)**

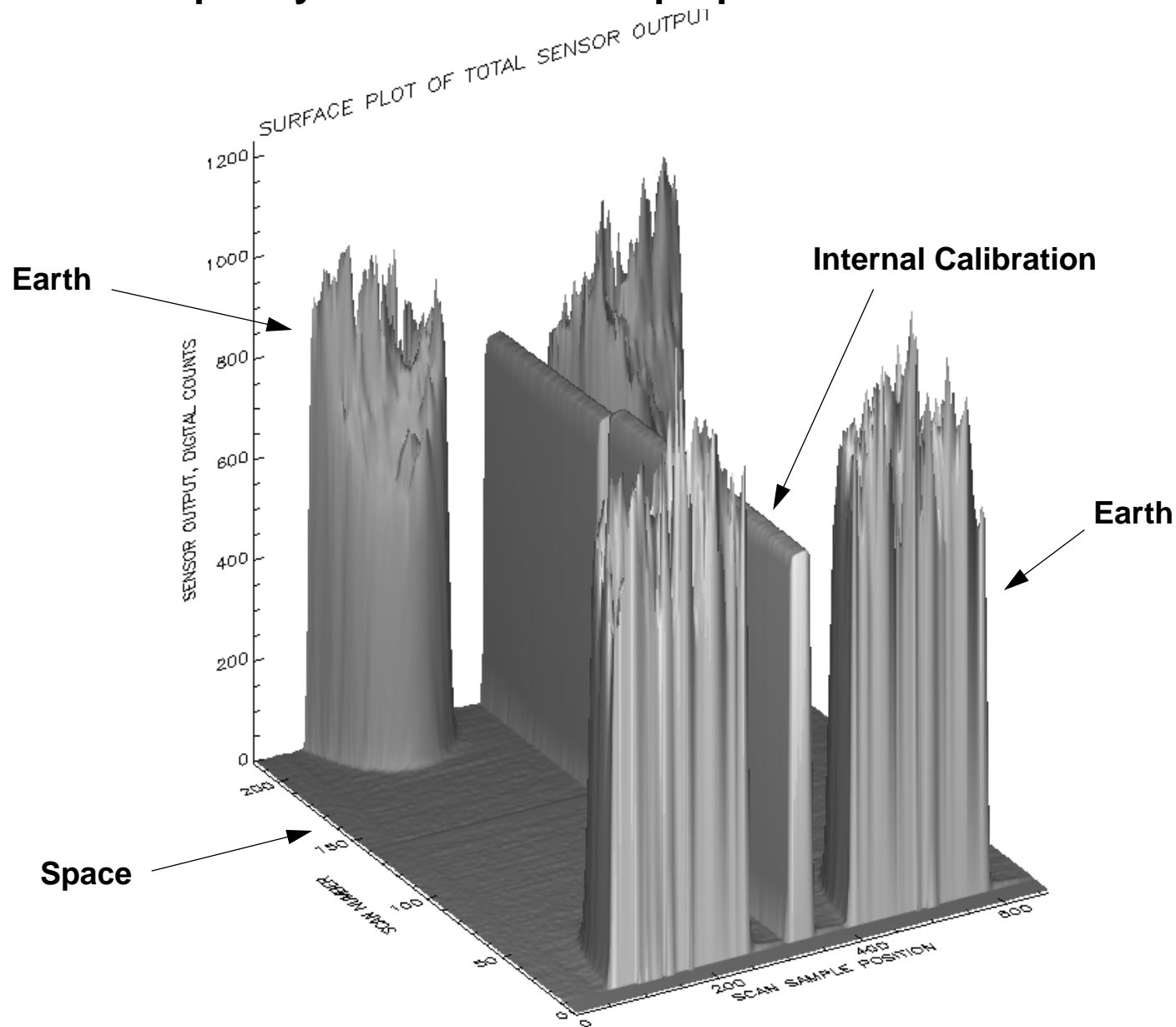
### **Current Status:**

- **Successfully supported TRMM launch and deep space calibration events**
- **Implemented over 30 revisions from analysis of actual data**
  - **Rapid digital-to-analog converter updates caused by thermal changes at sunrise/sunset**
  - **Geocentric to geodetic coordinate system**
  - **Enhanced spaceclamp and count conversion algorithms**
  - **Activated second time constant correction**
- **TRMM production software operational at DAAC and running continuously since launch**
- **BDS sample products made available to Science Team 2/13/98**
- **Continued development of IDL viewing/analysis tool for HDF output products**
- **Developed additional analysis/trending tools (beta/solar angle plots)**

### **Near-term Plans:**

- **Complete implementation for EOS packet formats**
- **Update current documentation including Data Products Catalog, User's Guide, and system design documents**

## Offsets quickly derived from Deep Space Calibrations - 1/7-8/98



- Bruce Barkstrom set goal at last meeting: Days, not years, to derive offsets for each channel
- On Monday, 1/11/98, Susan Thomas presented preliminary offsets at Instrument WG meeting

## **Working Group: ERBE-like**

### **Responsible for:**

- **Subsystem 2 (ERBE-like Inversion to Instantaneous TOA Fluxes)**
- **Subsystem 3 (ERBE-like Averaging to Monthly TOA Fluxes)**

### **Data Products:**

- **ES-8 (Equivalent to ERBE Instantaneous TOA Estimates)**
- **ES-9 (Monthly Averaged Regional Parameters)**
- **ES-4 (Monthly Averaged Regional, Zonal, Global Parameters)**
- **Scene ID, Spectral Correction, and ADM Ancillary Input Data Files**
- **Albedo Directional Model File**
- **ES-8 and ES-4 Browse Products**

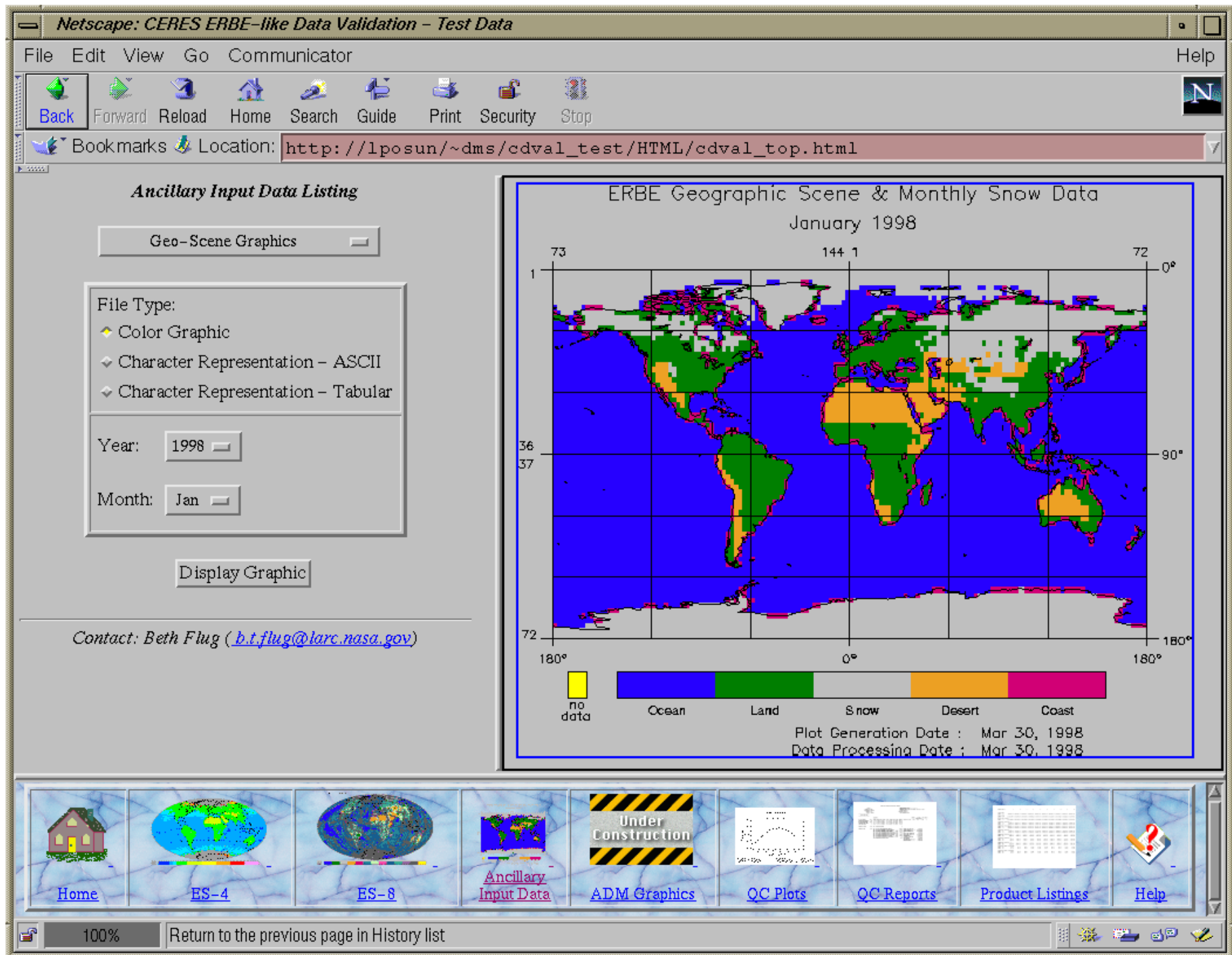
### **Current Status:**

- **With decision to postpone ERBE scanner data reprocessing, reverted to ERBE ADMs.**
- **New snow PGE generates Northern Hemisphere from SSM/I and Southern Hemisphere from ERBE monthly composite maps.**
- **New ES-8 and ES-4 post-processors to make products in HDF-EOS format.**
- **Snow ancillary input data, QC Plots, QC Reports, and Product Listing access capability added to the ERBE-like Web Site (used for internal validation)**
- **Results from the Longwave Tropical Constant and 3-Channel Intercomparison validation algorithms and beta angle added to Subsystem 2 QC report.**
- **Prepared several versions of spectral correction coefficients for SCF validation runs.**

### **Near-term Plans:**

- **Complete ES-9 HDF Generator.**
- **Add ancillary input data file names to ES-8, ES-9, and ES-4 metadata.**
- **Complete ES-8, ES-4, and ES-9 Collection Guides.**

## ERBE-Like validation site includes ancillary inputs (ADM's, spectral corrections)



# **Working Group: Clouds**

## **Responsible for:**

- **Subsystem 4.1 - 4.3 (Clear/Cloud Detection, Cloud Layers, Optical Properties)**
- **Subsystem 4.4 (Convolution with CERES Footprint)**

## **Data Products:**

- **SURFMAP (Surface Map and Properties)**
- **VIRS & MODIS & AVHRR (Cloud Imager Data)**
- **CRH (Clear Reflectance/Temperature History)**
- **Intermediate SSF (Single Satellite Footprint - Cloud Properties)**

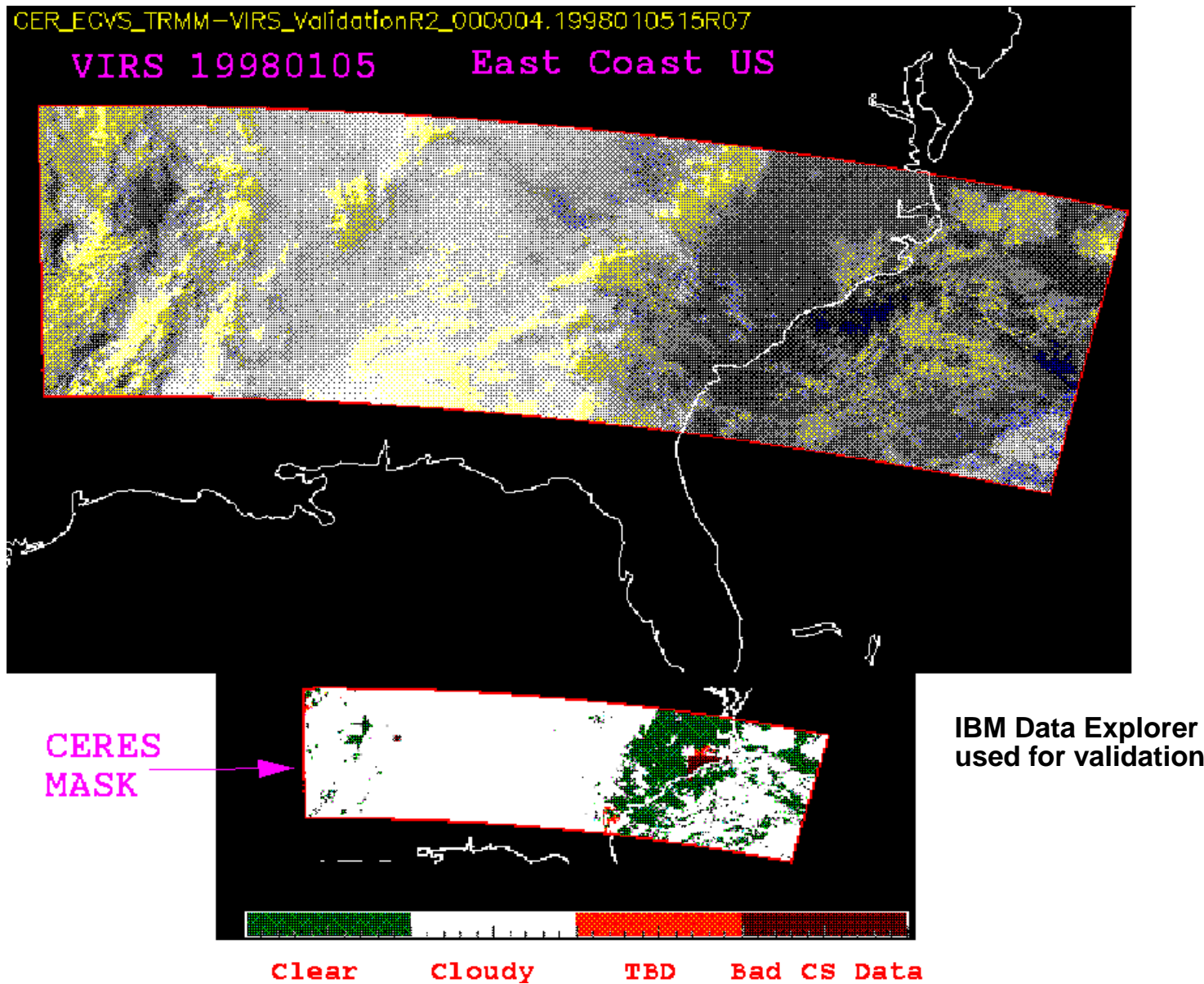
## **Current Status:**

- **F90 production code running on SGI in 64-bit mode, Irix 6.4 using Toolkit, HDF, Cereslib**
- **Delivered the latest version of the code to the DAAC on April 1, 1998. Includes:**
  - **A new version of the CERES Cloud Mask algorithm (day and night)**
  - **VINT algorithm with 'Correlated K' input parameters**
  - **Improved interpolation of MOA parameters**
  - **Surface emittance data**
  - **Diurnal cycle temperature differences**
  - **Improved QC reporting**
  - **Conversion to geodetic latitude on inputs and geocentric convolution**
  - **Addition of Narrowband Longwave Tropical Constant, NLTC**
  - **Procedures to handle missing/saturated VIRS visible channels**
- **The DAAC successfully processed the VIRS data and produced interim SSFs from Dec. 21, 1997 to Jan. 13, 1998 for 356 of 432 hours (82%)**
- **NLTC showed agreement within 1% between October 1986 AVHRR and December 1997 VIRS**

## **Near-term Plans:**

- **Prepare EOS-AM1 pre-launch delivery to incorporate the latest algorithms, the MODIS interface, ability to handle two IES inputs, and use the improved native SGI F90 compiler.**
- **Validation of SSF cloud properties and layers.**

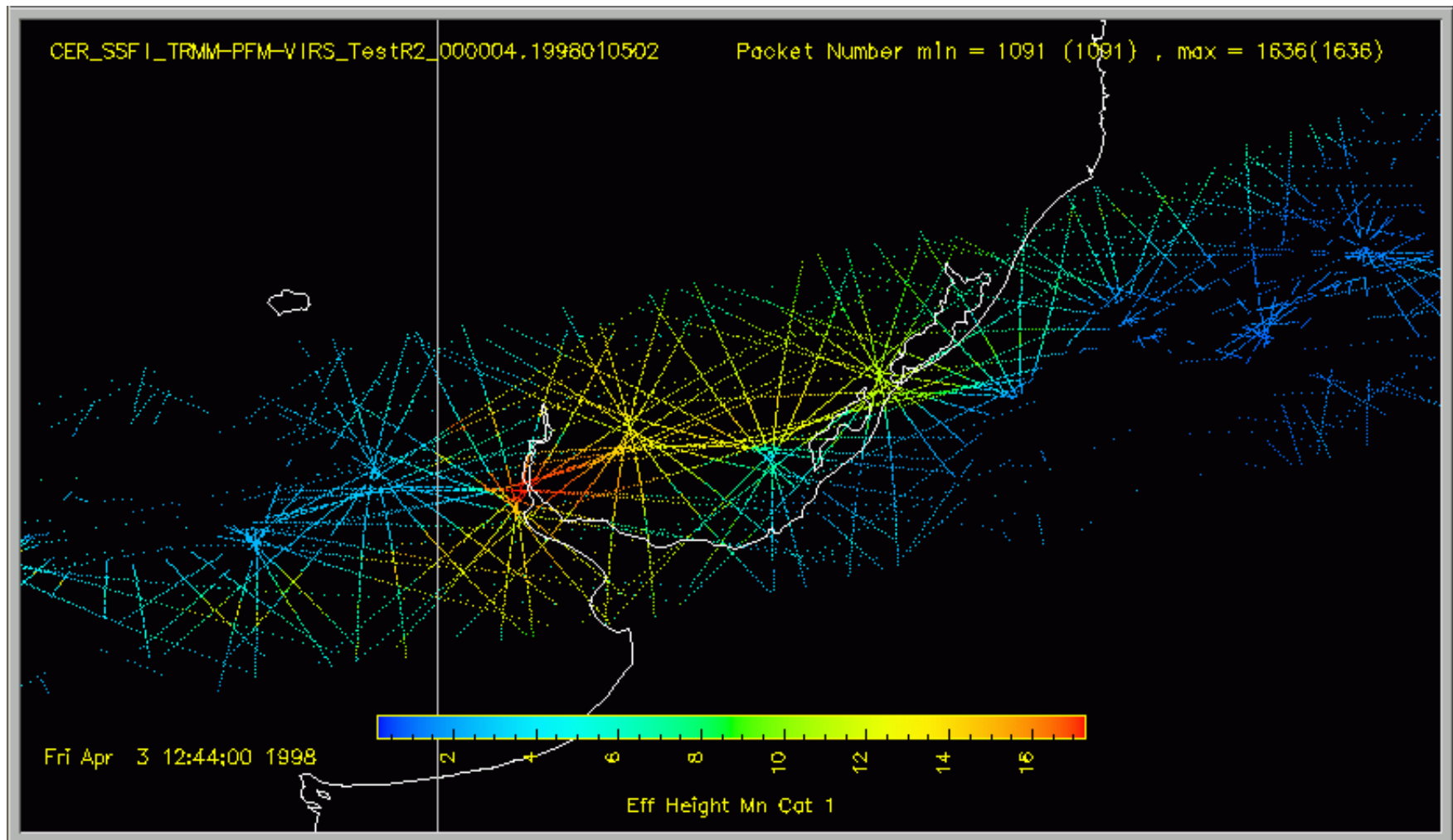
## Cloud mask example on first validation day





## Convolution results for RAPS mode

- Cross-track VIRS data overlaid with CERES footprints in Rotating Azimuth Plane Scan mode
- Effective cloud height over East coast of South America
- Black areas are either clear, insufficient VIRS data, or we can't determine cloud properties



## **Working Group: Inversion and Surface Estimation**

### **Responsible for:**

- **Subsystem 4.5 (CERES Inversion to Instantaneous TOA Fluxes)**
- **Subsystem 4.6 (Estimate Longwave and Shortwave Surface Radiation Budget)**

### **Data Product:**

- **Archival SSF (Single Satellite Footprint, TOA and Surface Flux, Clouds)**

### **Current Status:**

- **Software delivered for TRMM launch is running at DAAC**
- **HDF SSF read package available from DAAC. Package contains:**
  - **sample SSF written in HDF**
  - **read software written in C and calls HDF routines**
  - **supporting documentation, including ASCII listing of SSF contents**
- **Preparing another DAAC delivery to adjust for the following changes:**
  - **Geolocation has changed from geocentric to geodetic**
  - **Radiance to flux inversion will be done at surface and then raised to TOA**
  - **WN channel radiances and fluxes will be recorded per micron**

### **Near-term Plans:**

- **Deliver and begin running newest version of software at DAAC in April**
- **Update HDF SSF read package to agree with SSF soon to be in production at DAAC**
- **Finish and release draft copy of the SSF Guide**
- **Compare SSF scene id and flux to those computed by ERBE-like**
- **Generate first cut of daily and hourly QC reports**

# **Working Group: SARB - Surface and Atmospheric Radiation Budget**

## **Responsible for:**

- **Subsystem 5.0 (Compute Surface and Atmospheric Fluxes)**
- **Subsystem 7.2 (Synoptic Flux Computation)**
- **Subsystem 12.0 (Regrid MOA)**

## **Data Products:**

- **CRS (Single Satellite Footprint, and Radiative Fluxes and Clouds)**
- **SYN (Synoptic Radiative Fluxes and Clouds)**
- **MOA (Meteorological, Ozone, and Aerosol)**
- **MWH, APD, GAP, OPD External Ancillary Data Inputs**

## **Current Status:**

- **Subsystem 12.0 is in production at the Langley DAAC**
- **DAO GEOS-2 meteorological data now input into Subsystem 12.0**
- **Horizontal interpolation of SSM/I data added to Subsystem 12.0 to eliminate data gaps without using NVAP climatology**
- **Subsystem 5.0 completed a 30-day test using October 1986 input data**
- **Subsystem 5.0 now being promoted to production status at the Langley DAAC**
- **Software to produce an HDF version of the CRS completed**
- **Subsystem 7.2 delivered to DAAC and successfully tested in SSI&T**
- **Preparing parameter definitions for MOA, CRS, and SYN Collection Guides**

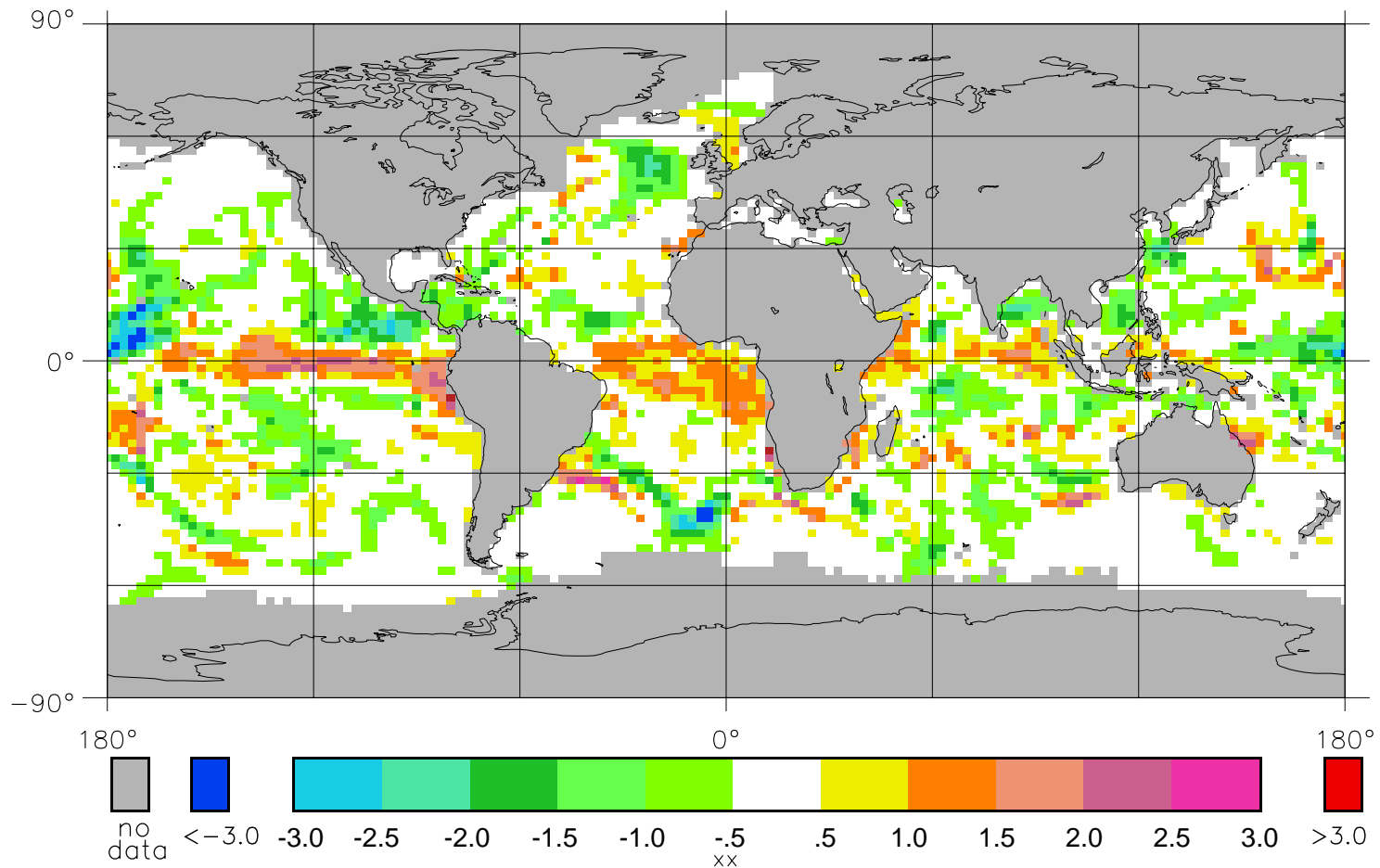
## **Near-term Plans:**

- **Enhance validation tools and continue validating MOA, CRS, and SYN output files**

## MOA now includes DAO GEOS-2 results

MOA Data January 1, 1998 Hour 00  
Precipitable Water Difference Plot ( SSMI - DAO)

DAO 2x2.5 degree grid



Min Value = -3.33409  
Max Value = 3.68189

Processing Date : Apr 3, 1997  
Plot Generation Date : Apr 7, 1998

# **Working Group: TISA - Time Interpolation and Spatial Averaging**

## **Responsible for:**

- Subsystem 6 (Hourly Gridded Single Satellite Fluxes and Clouds)
- Subsystem 7.1 (Time Interpolation for Single and Multiple Satellites)
- Subsystem 8 (Compute Regional, Zonal and Global Averages)
- Subsystem 9 (Grid TOA and Surface Fluxes)
- Subsystem 10 (Compute Monthly and Regional TOA and SRB Averages)
- Subsystem 11 (Grid Geostationary Narrowband Radiances)

## **Data Products:**

- FSW - Hourly Gridded Single Satellite Fluxes and Clouds (Subsystem 6)
- SYN - Synoptic Radiative Fluxes and Clouds (Subsystem 7)
- AVG, ZAVG - Monthly Regional, Zonal and Global Radiative Fluxes and Clouds (Subsystem 8)
- SFC - Hourly Gridded Single Satellite TOA and Surface Fluxes (Subsystem 9)
- SRBAVG - Monthly Regional TOA and SRB Averages (Subsystem 10)
- GGEO - Ancillary Data Product: Gridded Geostationary Data (Subsystem 11)

## **Current Status:**

- Release 2 code was delivered and tested at the DAAC.
- Currently no production processing has occurred at the DAAC (waiting for geostationary data and Clouds).
- Optimizing Post MOA product to reduce memory storage requirements

## **Near-Term Plans:**

- Complete the implementation and testing of the hour and month overlap logic for Subsystem 9 (local hours)
- Test the precipitable water algorithm, cloud column weighted algorithm, and cloud layer algorithm
- Produce read software for the TISA Gridding products.
- Implement the algorithm for the surface directional models into SS 7.1.
- Automatically produce plot files for posting on the web following production processing.
- Adding QC reports to the main and post processors for GGEO (SS 11)
- Move the calibration tables for GGEO from the source code to ancillary data files. This allows for updates of the tables without redelivering and recompiling the source code.

# **CERES System Engineering Committee**

**Charter:** Coordinate solutions to issues which cross working group boundaries

**Members:** Maria Mitchum (DMO), Sandy Nolan (SAIC), Jill Travers (DAAC)

## **Items Resolved:**

- Streamlined Science Software Integration & Test (SSI&T) procedures. Divided SCF and DAAC functions to avoid duplication of work and to provide more extensive operational testing.
- Established storage area for validation products which are pushed to the SCF at the end of a successful PGE. Provides quicker access for quality assessment.
- Established 'CERES DMT to DAAC Processing Request' form.
  - Objective: more formal documentation and establish an audit trail

## **Current Issues:**

- Established version number tracking for all Internal and External changes affecting a product. The Internal tracker nearly ready to be implemented. External tracker - TBD.
- DRAFT 'CERES TRMM Processing System Requirements at LaTIS' completed and system under development at DAAC. CERES data processing continues manually
- Collecting processing details for 43 PGE's
- Determine staging requirements and renaming convention for External Ancillary Data Sets
- Defining automated output product disposition at the end of a successful PGE:
  - Archive, push to QA disk area, remove
  - Delete
  - Hold for next PGE
- EOS AM1 Level Zero/Ephemeris/Attitude details challenging - different from TRMM

## **Validation and Visualization Aids**

**Develop tools for visualizing CERES data products to assist software development and support production processing and validation - understand the data and identify discrepancies**

### **Features:**

- **Interactive visualization and analysis**
- **Visualize CERES archival and validation data products**

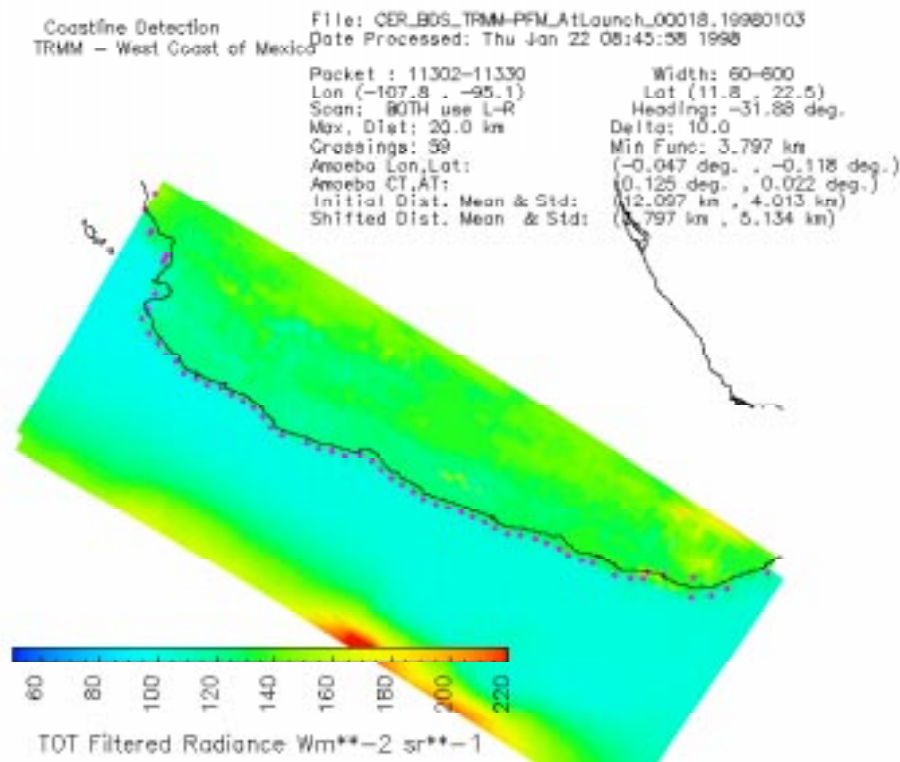
### **Current Status:**

- **IDL code for HDF data product analysis (BDS, IES, ES8, ES4, SSF)**
- **IBM Data Explorer (DX) programs for Earth-viewing measurements (IES, BDS, SSF, ES8)**
- **Coastline Detection Program for CERES geolocation accuracy assessment**
- **DX programs for CloudVis and Gridded Cloud validation**
- **IDL and GrADS for gridded products**

### **Benefits and Findings:**

- **Provided early checkout of TRMM instrument data**
- **Verified CERES location to within 10% of field of view**
- **Cloud WG continues to use for validation**

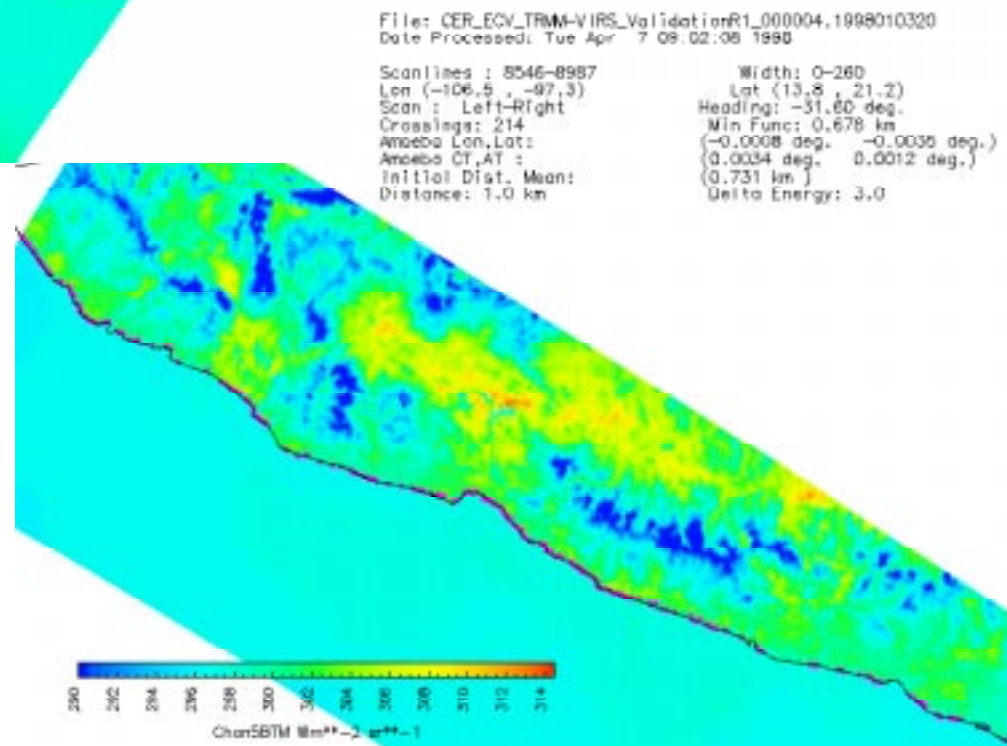
# DX used for CERES and VIRS geolocation validation



- Initial results showed bias due to geocentric vs. geodetic latitude
- Part of investigation showed sunrise/sunset perturbations in TRMM attitude angles
- Thorough study of all factors in geolocation calculations demonstrated excellent accuracy

Simultaneous VIRS passes used to screen CERES results

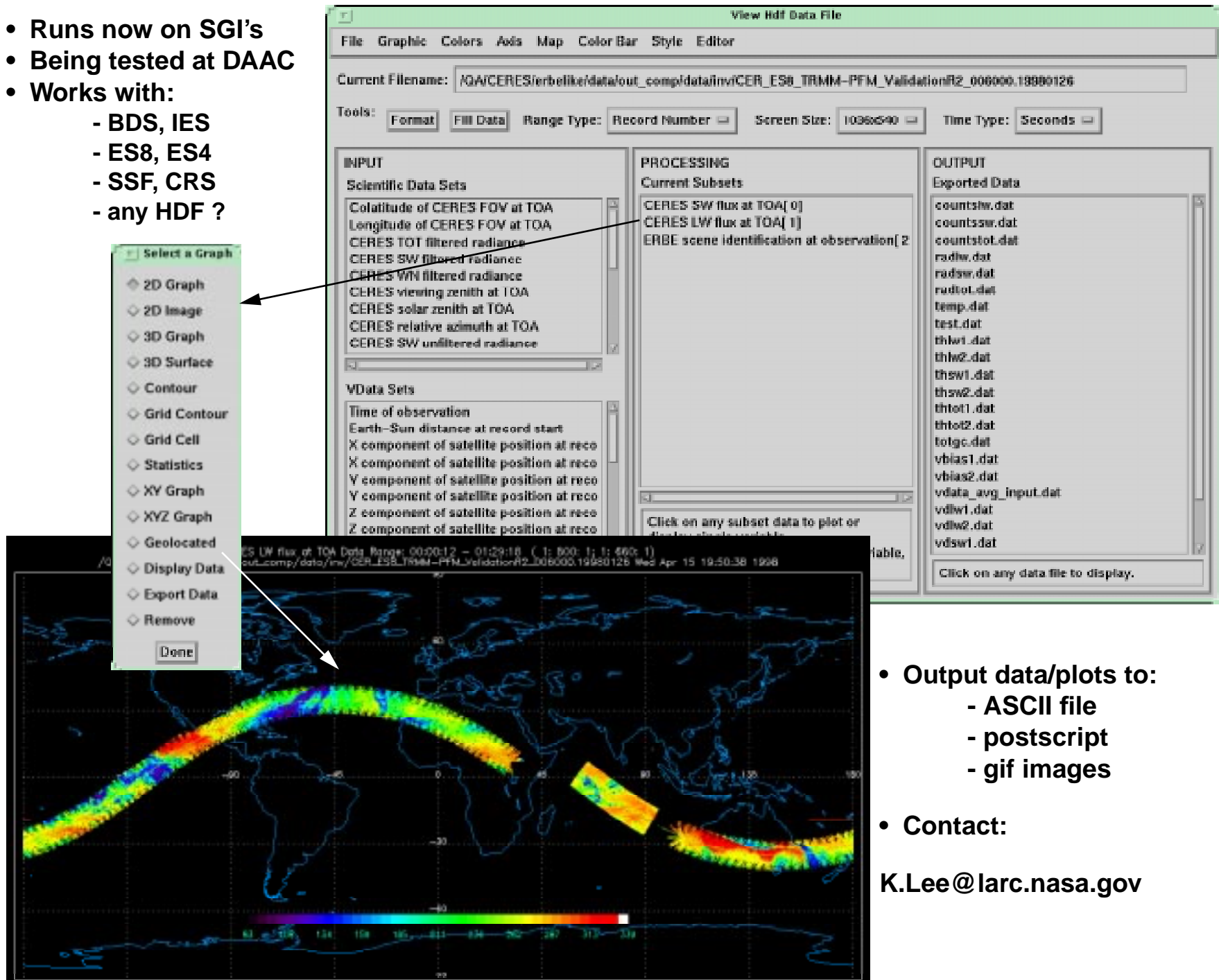
Coastline detection for VIRS shows accurate location





## Tools such as 'view\_hdf' (using IDL) can help validate HDF products

- Runs now on SGI's
- Being tested at DAAC
- Works with:
  - BDS, IES
  - ES8, ES4
  - SSF, CRS
  - any HDF ?



- Output data/plots to:
  - ASCII file
  - postscript
  - gif images

- Contact:

K.Lee@larc.nasa.gov

## **Science Computing Facilities**

**New development, integration and testing server (lightning - completed configuration)**

- **SGI Origin 2000 (IRIX 6.4) configured to match DAAC (LaTIS) as closely as possible**
- **16 R10000 processors**
- **700 GB of disk space (goal is to provide enough storage for 1 month of validation products)**
- **Added temporary QA staging area to facilitate fast access to window of data products**

**New visualization and validation server (asdsun - planned configuration)**

- **Sun Enterprise 5000 currently with 4 167MHZ processors**
- **8 336MHZ processors due in any day (existing 4 processors will be replaced)**

**On/Off-site LAN and WAN network upgrades**

- **Dedicated FDDI interface between DAAC and SCF being tested for improved transfer rates**
- **Local FDDI link now in use to cluster servers (thunder & lightning)**
  - **asdsun and near line tape archive storage device will be added soon**
- **WAN to SAIC off site network upgraded from 3 to 10 Mbps**

**Several Microsoft NT servers configured to serve PC applications to all UNIX workstations**

...

## Release 2 PGE Size as Delivered to LaRC DAAC - 4/98

Working Group	SS	PGE	Delivery Date	Software, Bytes				Data, MB	
				Code	Scripts	SMF/PCF	Misc	In	Out
Instrument	1.0	Instrument	3/20/98	4834753	247728	161639	1197	210	1880
ERBE-like	2.0 & 3.0	Daily and Monthly	4/3/98	2533954	700690	419875	20234	397	1523
Clouds	4.1 - 4.4	Cloud Retrieval & Footprint Convolution	4/1/98	3288000	360000	56000	42900	545	412
Inversion	4.5 - 4.6	TOA/Surface Fluxes	4/18/98	489957	64095	63125	4136	202	380
SARB	5.0	Instantaneous SARB	4/10/98	553566	55024	20455	34008	213	207
	7.2	Synoptic SARB	1/16/98	724928	32856	18191	8742	2212	84
	12.0	MOA Regridding	4/10/98	494480	46426	36918	22624	93	319
TISA	6.1-6.3	Atmospheric Gridding	3/10/98	(ss9)	(ss9)	(ss9)	(ss9)	48	61
	7.1/8/10	Regional & Synoptic Avg	3/10/98	1154996	62931	189833	56733	6146	23000
	9.1	Post- MOA Processor	3/10/98	12927	14542	(ss9)	(ss9)	305	5500
	9.2-9.4	Surface Gridding	3/10/98	1072858	107100	20939	350748	39	14
	11.0/11.1	Grid Geostationary	2/27/98	628387	53318	140978	11248	30	571
System		CERESlib & Utilities	3/27/98	3495620	22920	26858	18470648	0	0
System Total				19284426	1767630	1154811	19023218	10440	33951

## PGE Software Size Comparison From Release 1 in 9/96 to Release 2 in 4/98

Working Group	SS	Release 1 Software, Bytes				Release 2 Software, Bytes			
		Code	Scripts	SMF/PCF	Misc	Code	Scripts	SMF/PCF	Misc
Instrument	1.0	2333040	17459	79149	6062707	4834753	247728	161639	1197
ERBE-like	2.0 & 3.0	1385374	93015	12082	40510	2533954	700690	419875	20234
Clouds	4.1-4.4	2656365	25880	28449	4594	3288000	360000	56000	42900
Inversion	4.5-4.6	137563	2123	4445	0	489957	64095	63125	4136
SARB	5.0	405208	1417	15173	29125	553566	55024	20455	34008
	7.2	413415	1644	18171	29752	724928	32856	18191	8742
	12.0	296283	4049	22497	22923	494480	46426	36918	22624
TISA	6.1-6.3	(ss9)	(ss9)	22241	0	(ss9)	(ss9)	(ss9)	(ss9)
	7.1/8/10	699674	2105	51072	337	1154996	62931	189833	56733
	9.1	46121	574	12136	540	12927	14542	(ss9)	(ss9)
	9.2-9.4	475224	3828	21204	0	1072858	107100	20939	350748
	11.0/11.1	217806	1120	24776	0	628387	53318	140978	11248
System		739723	0	8061	2694	3495620	22920	26858	18470648
System Total		9805696	153214	319456	6193182	19284426	1767630	1154811	19023218
System Percent Increase/Decrease						97%	1054%	261%	207%

# CERES Post-Launch DAAC Production Measurements - 4/1/98

One execution on LaTIS configuration of each PGE for actual production of January 5, 1998 TRMM data

SS	PGE	Compiler	Test Date	Time, sec			Block I/O		Memory, MB	Disk Storage, MB			Runs per Mnth
				Wall	User	Sys	In	Out		In	Int	Arch	
1.0	Instrument	Ada	02/02	18745	18236	179	68689	9913	309	210	887	992	31
2.0	Daily TOA Inversion	SGIF90	03/11	1626	1080	274	36934	38	71	278	0	482	31
3.0	Monthly Averaging	SGIF90	03/11	214	162	41	2029	184	16	119	0	75	1
4.1-3	Cloud Retrieval	SGIF90	03/24	4082	3939	42	4547	7	416	313	757	168	744
4.4	Footprint Convolution	SGIF90	03/24	2451	2345	22	8740	4	416	793	0	200	744
4.5-6	TOA/Surface Fluxes	SGIF90	03/25	145	33	107	3268	8	4	214	0	200	744
5.0 7.2 12.0	Instantaneous SARB Synoptic SARB MOA Regridding	NAG 32	02/06	1737	1666	38	36102	30	45	43	0	320	31
6.0 6.1 9.1 9.2 9.3	Atmospheric Gridding Sort SFW Files Post-process MOA Surface Gridding Sort SFC Files												
11.0 11.1	Grid Geostationary Sort GGEO												
7.1 8.0 10.0	Synoptic Interpolate Synoptic Averaging TOA/SRB Averaging												
System Total													

**System total: multiply each PGE measure by the number of Runs per Data Month for that PGE, then add all PGE's. Some PGE's will require more resources for each instrument on EOS-AM and EOS-PM.**

## CERES Post-Launch Processing Time - 4/98

Number of wall-clock hours required to run one month of data through each subsystem

SS	PGE	Runs/ Month	9/96 Release 1	10/97 Release 2	4/98 Post-Launch
1.0	Instrument	31	69	120	161
4.1-3	Cloud Retrieval	744	1074	675	844
4.4	Footprint Convolution	744	613	277	507
5.0	Instantaneous SARB	744	10731	5611	(5611)
6.0	Atmospheric Gridding	744	789	124	(124)
7.2	Synoptic SARB	248	187	(187)	(187)
9.2	Surface Gridding	744	786	108	(108)
	Remaining PGE's		37	142	(142)
Total hours for one month of data			14286	7250	7684
Number of CPU chips at 80%			25	13	14

- Release 1 measurements scaled from R8000 to R10000 chips and NAG to SGI compilers
- The LaTIS computer used for CERES processing has 32 CPU chips, thus reprocessing capacity

## **Current Processing Issues for Each Working Group**

### **System-Wide:**

- **Staging of data between working storage and permanent archival must be streamlined**
- **Update QA flags on Data Product granules**
- **Data Set Guides to be distributed with each product need a lot of work**
- **Need the right level of documentation of the as-built code to ease future maintenance**

### **Instrument:**

- **Verification of EOS-AM input file formats (Level 0, ephemeris/attitude)**
- **Analysis of thermal vacuum test and simulation results from both instruments on EOS-AM**

### **ERBE-Like:**

- **Complete ES-9 HDF generator.**
- **Add ancillary input data file names to ES-8, ES-9, and ES-4 metadata.**
- **Complete ES-8, ES-4, and ES-9 Collection Guides.**

### **Clouds:**

- **How frequently will CRH be updated? Currently, CRH is updated once a day. The orbital inclination of the TRMM spacecraft may necessitate a different update schedule.**
- **Daunting validation task to make sure all the cloud properties are accurate.**

## **Current Processing Issues for Each Working Group**

### **Inversion/Surface Estimation:**

- **Verify that any requested algorithm changes are implemented correctly**
- **Update SSF HDF Read Package as needed to accomodate changes to SSF granules and incorporate user suggestions**
- **Work offline on updates to Staylor algorithm (downward SW surface flux, Model B)**
- **Finish and place initial version of daily/hourly QC file readers online**
- **Examine daily QC output**
- **Examine SSF granules produced at DAAC, particularly Validation days**

### **SARB:**

- **Considering adjusting GEOS-2 precipitable water over oceans with SSM/I value**

### **TISA:**

- **Finish hour overlap and month overlap logic for Gridding, SS9 (Local Hours)**
- **Implement and test the precipitable water beneath clouds algorithm.**
- **Implement algorithm for the surface directional models into SS 7.1.**



## **What are all these versions?**

**A sample file name: CER\_BDS\_TRMM-PFM\_Edition1\_006000.19980411**

### **AtLaunch:**

- **Quick-look results**
- **No corrections**
- **Don't use for anything serious!**

### **ValidationR1:**

- **DAC update correction for rapid thermal changes at sunrise/sunset**
- **Proper coefficients for each channel rather than placeholders**

### **ValidationR2:**

- **Deep-space calibration zero-radiance offsets**
- **2nd time constant numerical filter**
- **Revised shortwave gain (1.8%)**
- **First set of revisions to spectral correction coefficients**

### **ValidationR3:**

- **Another set of revisions to spectral correction coefficients**

### **Edition1:**

- **'Final' version of Instrument Subsystem output**
- **Includes over 30 changes identified after launch**
- **Should be stable for a while (until the next glitch!)**

## **Near-Term Plans**

- **Continue running Instrument subsystem daily in production mode**
- **Continue running ERBE-like Subsystem daily as QC check on instrument operations**
- **Finalize ERBE-like products for archival or validation (choice is TBD!)**
- **Move remaining subsystems into more production-like mode at DAAC for validation**
- **Update documentation on system and data products**
- **Work with DAAC to automate and streamline production processing**
- **Continue EOS-AM1 modifications and testing**
- **Update external data source requirements**